

Regression Group Worksheet Key

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Situation:

You are the 1980 (incumbent) Presidential economic advisor. Since this is an election year the President would like you to prepare the projected social insurance expenditures for the years 1981 through 1984 (inclusive) based on the table below. For the Presidential debate coming up soon the President also needs the long range predicted social insurance expenditures for the year 2000. (*Note: Use 60, 65, 70 etc. as the independent variable values when graphing.)

Federal Expenditures on Social Insurance (in millions of dollars) from Moore & McCabe

Year	1960	1965	1970	1975	1980
Spending	14,307	21,807	45,246	99,715	191,162

Answer the following using your graphing calculator (round to 3 decimal use all values for places on the sheet but calculations):

1) Is the data linear or curvilinear?

1) **Curvilinear**

2) For the given data find the *best fit* equations:

a) quadratic regression

2a) **$y = 568.254x^2 - 70937.240x + 2226700.486$**

b) exponential regression

2b) **$y = 4.0678 * 1.144$**

c) power regression

2c) **$y = 3.709 E -13x^{9.288}$**

3) Have each person graph the data points and only one of the equations (i.e. each calculator should have a different graph on it). By observation only, which regression above in your opinion is the *best fit* for the data?

3) **Answers vary**

4) Your projected expenditures for the years 1981 through 1984 inclusive would be based on which of the above equations? (*Note: You want the projected expenditures to be as low as possible.)

4) **power regression**

over

5) Graph the data points and equations out to the year 2000 (i.e. $x = 100$) then TRACE over to 2000 (hint: divide up the work). Note: You could also use the TABLE feature on the calculator (except on TI81's). WINDOW/RANGE Hints:

TI81's use X[58 , 105.5], Y[-350000 , 3000000]; for
TI82's and TI83's use X[58 , 105], Y[-350000 , 3000000]; for
TI85's use X[58 , 120], Y[-350000 , 3000000]

a) Your projected expenditures for the year 2000 would be based on which of the regression equations? 5a) **quadratic regression**
(*Note: You want the projected expenditures to be as low as possible.)

b) What will be your projected expenditure for the year 2000? 5b) **\$816,519.34 million**

6) For the same set of data,
a) do you think it is proper (ethical) to use different equations in different projected situations? (yes or no) 6a) **No?**

b) Explain using complete sentences:

Answers Vary

7) Explain, using complete sentences, a situation when the exponential regression projection for the year 2000 would be used.

Answers Vary

Extra Credit:

A) Who was the incumbent President in 1980? A) **Jimmy Carter**

B) Who ran against him in 1980 and defeated him? B) **Ronald Reagan**

C) The answer to B) was what number president? C) **40th**